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Application No.: 10/633,791

AMENDMENTS TO THE CLAIMS

Please amend claims 1 through 4, 6, 13 through 15, 17, 21 through 26 and 28, and cancel claims 5, 16, 18 and 19, such that the claims of the application have the following formulations and statuses:

1. (Currently amended) A method for iterative decoding comprising:

generating an output based on a received coded signal using a first soft-input soft-output device having based on a first trellis structure; and processing providing the output in an iterative loop using of the first soft-input soft-output device to an input of a second soft-input soft-output device having based on a second trellis structure, the second soft-input soft-output device further having an output which is coupled to an input of an iterating decoder which in turn has an output thereof coupled to an input of the second soft-input soft-output device to form a decoding loop.

2. (Currently amended) The method of claim 1 further comprising:

receiving a coded signal from a communication channel prior to that is coupled to an input of the first soft-input soft-output device for the generating [[an]] of a decoded output signal.

3. (Currently amended) The method of claim 2, wherein the communication channel ~~is a channel~~ on includes a hard drive magnetic disc of a computer.

4. (Currently amended) The method of claim 1, wherein the second trellis structure represents fewer alternative device states than the first trellis structure.

5. (Cancelled)

6. (Currently amended) The method of claim 1, wherein the first trellis structure and the second trellis structure represent factors of a mathematical equation model representative of at least a communication channel and a precoder.

7. (Previously presented) The method of operating a turbo decoding circuit for decoding a received signal from a channel which can be represented by a mathematical model that is a convolution of two or more equations, one of the two or more equations being a complicated equation, the method comprising:

processing the received signal with a first SISO device having a trellis structure corresponding to state-outputs of the complicated equation;

processing an output of the first SISO device with one or more secondary SISO devices corresponding to state-outputs of each remaining equation of the two or more equations; and

iteratively decoding an output of the one or more secondary SISO devices corresponding to state-outputs of each remaining equation.

8. (Previously presented) The method of claim 7, wherein the step of processing the received signal comprises:

inputting the received signal into the first SISO device; and

generating from the first SISO device a soft-output corresponding to the received signal.

9. (Previously presented) The method of claim 7, wherein the step of processing an output of the first SISO device comprises:

inputting the output of the first SISO device into one or more secondary SISO devices; and

generating a soft-output based on the output of the first SISO device.

10. (Previously presented) The method of claim 7, wherein iteratively decoding comprises:

inputting a soft-output output of the one or more secondary devices into a de-interleaver; and
passing the de-interleaved soft-outputs to a decoder.

11. (Previously presented) The method of claim 10, wherein iteratively decoding further comprises:

subtracting a de-interleaved soft-output from the one or more secondary SISO devices from an output of the decoder to form a difference value;
interleaving the difference value;
inputting the interleaved difference value into the one or more secondary SISO devices as a secondary input; and
subtracting the interleaved value from the soft-output of the one or more secondary SISO devices.

12. (Previously presented) The method of claim 7, wherein iteratively decoding comprises:

rendering soft-outputs in one of four states based the output received from the first SISO device.

13. (Currently amended) An apparatus for turbo decoding coded information received from a communication channel, the apparatus comprising:

a first SISO soft-input soft-output device having based on a first trellis structure, the first SISO soft-input soft-output device for receiving the coded information at an input thereof; and

a decoder loop having therein a second SISO soft-input soft-output device with based on a second trellis structure with an output of the second soft-input soft-output device coupled to an input of an iterating decoder also in the decoder loop having in turn an output thereof coupled to an input of the second soft-input soft-output device, the decoder loop for receiving ~~a soft-~~ at a device therein an output signal from an output of the first SISO soft-input soft-output device and for iteratively generating with the second soft-input soft-

output device and the iterating decoder ~~[[an]]~~ ~~output value~~ values at a device
therein representative of the received coded information.

14. (Currently amended) The apparatus of claim 13 wherein the decoder loop further comprises:

~~a decoder device;~~

~~a de-interleaver in communication with the decoder and~~ coupling the output of the
second SISO soft-input soft-output device to the input of the iterating
decoder; and

~~an interleaver in communication with the decoder and~~ coupling the output of the
iterating decoder to the input of the second SISO soft-input soft-output
device.

15. (Currently amended) The apparatus of claim 13 wherein the communication channel ~~[[is]]~~
includes a magnetic disc track ~~[[on]]~~ in a hard disc drive.

16. (Cancelled)

17. (Currently amended) The apparatus of claim 13 wherein the first ~~SISO device~~ has trellis structure
represents more possible alternative device states than the second ~~SISO device~~ trellis structure.

18. (Cancelled)

19. (Cancelled)

20. (Previously presented) The apparatus of claim 13 wherein the decoder loop is implemented in
a parallel architecture in a circuit.

21. (Currently amended) The apparatus of claim 13 wherein the first trellis structure ~~of the first SISO~~
~~device is~~ has more complex alternative device states than the second trellis structure ~~of the second~~
~~SISO device, and further comprising:~~

~~a third SISO device for receiving the soft-output directly from the first SISO device and for improving the soft output, wherein the second SISO device receives the soft-output from the first SISO device indirectly.~~

22. (Currently amended) An apparatus for turbo decoding information in a coded signal comprising:

a first SISO device ~~having based on a n-state first trellis structure, the first SISO device~~ for receiving ~~[[a]] the~~ coded signal and for generating ~~[[an]] output~~ ~~[[bit]] bits and [[a]] reliability [[bit]] bits~~ corresponding to the coded signal; and

a ~~Turbo turbo~~ decoder loop having a ~~second plurality of SISO device with devices~~ each having an output coupled to an input of another and each based on a m-state corresponding loop device trellis structure at least one of which differs from the first trellis structure and including a SISO device for receiving the output ~~[[bit]] bits and the reliability [[bit]] bits, [[and]] the decoder loop~~ for iteratively generating a decoded output signal at a device therein corresponding to the coded signal.

23. (Currently amended) The apparatus of claim 22 wherein the ~~Turbo turbo~~ decoder further comprises:

~~a decoder device;~~

~~an interleaver in communication with the decoder device and the second SISO device~~ coupling an output of one of the plurality of SISO devices to an input of another; and

~~a de-interleaver in communication with the decoder device and the second SISO device~~ coupling an output of one of the plurality of SISO devices to an input of another.

24. (Currently amended) The apparatus of claim 22 wherein the information coded signal is received from a magnetic recording medium.

25. (Currently amended) The apparatus of claim 22 wherein the first trellis structure characterizing the first SISO device state trellis structure according to is based on a chosen alphabet and a channel memory length.

26. (Currently amended) The apparatus of claim 22 wherein ~~n is greater than m~~ the first trellis structure has more alternative device states than the trellis structure corresponding to that one of the plurality of SISO devices receiving the output and reliability bits.

27. (Previously presented) The apparatus of claim 22 wherein the decoder loop is implemented in a parallel architecture in a circuit.

28. (Currently amended) The apparatus of claim 22 wherein the ~~n-state~~ first trellis structure and the m-state loop device trellis structure corresponding to that one of the plurality of SISO devices receiving the output and reliability bits are representative of ~~individual~~ corresponding factors of a mathematical function representative of ~~[[the]]~~ a communication channel coupled to the first SISO device for transmitting the coded signal thereto.